

## STUDY OF FOOD PARAMETER AND PATTERN OF ACTIVITY OF MABUYA MULTIFASCIATA FITZINGER IN ASSAM

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### ABSTRACT

Skink belonging to the family Scincidae. *Mabuya multifasciata* exhibits a broad geographical range, throughout Asia with little genetic differentiation, across the range. The poikilotherm reptiles require the sun's energy, to regulate their body temperature, thus affecting their activity pattern. Skinks as poikilotherm do the same. Previous studies on the skinks have shown that, temperature influences many biological process in organisms and has consequences on their habitat requirements and hence, special distribution (Tinkle and Gibbons, 1977; Angilletta et al., 2002b; Edwards and Richardson, 2004; Helland et al., 2007; Martin and Huey, 2008). The study site was chosen in Darrang district of Assam and was aimed, to determine the diet of *Mabuya multifasciata*. The ecology of the study sight also understood. Food habits of this lizard were studied by means both of stomach dissection of individuals, found already dead in the field and faeces analysis of living individuals. Samples were collected and holding individuals, for 24 hours and collecting any faeces. Opportunistic collection also made. Invertebrate like insects are predominant food sources, from both the faecal analysis and observation data. Among insects Coleoptera species are predominant. Activity patterns show that *Mabuya multifasciata* was observed 26 % in between 7am-9am, 36% in between 9am-11am, 51% in between 11am-1pm, 20 % in between 1pm-3pm, 8 % in between 3pm-5 pm. The major visual encounter occurs around 12 noon.

**KEYWORDS:** *Mabuya Multifasciata*, Food, Skinks, Data & Coleoptera Species

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### INTRODUCTION

As killing of specimens for biological work and analysis, is against the conservation, which is one of the central thought and aims of the zoological community, the study was done depending on alternative method of analysis to killing. For the dietary analysis of this lizard populations, "stomach flushing" method was applied. Analysis of faecal pellets was also done. Strijbosch (1986), compared data of diet obtained from *Lacerta vivipara* (lizard), collecting in Netherlands with diet data available, on analysis of stomach contents in the literature. For this author, for the testing of reliability of FPA ( Faecal pellets analysis), is to compare the dietary data recovered both from FPA and stomach dissection, by using the same lizard specimens or at least lizards, belonging to the same population. Considering this, in the present study we decided to test the reliability of FPA, and for this selected *Mabuya multifasciata* as study specimen.

*Mabuya multifasciata* is a skink, belonging to the family Scincidae. It exhibits a broad geographical range throughout Asia with little genetic differentiation across the range. It appears to have excellent dispersal abilities both through natural and human mediated means. It is one of the most conspicuous lizards in this area of the world due to its size, as well as because it is diurnally active and thrives in disturbed lowland habitats (Barley, Anthony; Siler, Cameron)

This species is active diurnally in open areas, where it can be found basking, however it can also be found hiding under bark, piles of vegetation and in tree holes.

As skinks are the poikilotherm reptiles, they require the sun's energy to regulate their body temperature, thus affecting their activity pattern. Previous studies have shown that, temperature influences many biological process, in organisms and has consequences on their habitat requirements and hence, special distribution (Tinkle and Gibbons, 1977 ;Angilletta et al., 2002b ; Edwards and Richardson, 2004 ; Helland et al., 2007 ; Martin and Huey, 2008 ). It has shown on the earlier studies that peak activity generally correlates with higher air and substrate temperature, in other skink (Crawford and Thorpe, 1979 in Cheke, 1984). Direct observations were made.

In this present study we address the following issues :

- What does the skink *Mabuya multifasciata* feed upon in Asaam?
- What is the pattern of activity of this lizard?

### Study Area

The ecology of the study site was understood. In generally *Mabuya multifasciata* is a ground dwelling skink. They also live in burrows. All the field data are collected in 2011-2012 at the study site in plain area. Assam and Burma are parts of Eastern Borderlands, a region largely of tertiary mountains, characterized by highly humid tropical climate and remarkable for the wealth and diversity of vegetation and flora. The study area Darrang district is situated in the eastern part of India, on the north-east corner of Assam. Located on the bank of the mighty Brahmaputra, the district is largely plain. The district lies between 26°25' and 26° 55' northern latitude and 91° 45' and 91° 20 'eastern latitude. As the area is covered by various plants and grasses, it provides good nesting places on the burrows. They are also found on the pipes which were blocked by rocks, under the falling litters.

### METHODS

Direct observations were made. The study was conducted on the habitat types, in the study area. The sites were randomly selected. The habitats are defined by vegetation. Most of the habitats were dominated by the common grass species, ferns, etc. Each observation and all items consumed noted, they were categorized into insects, lizards, other. There was also a comment column for record the notes on activity like. Species of skink and an estimate of snout-vent length were made.

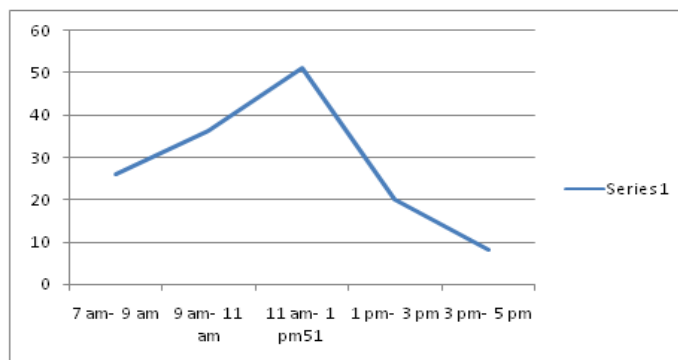
Interaction of the skink and observer being observed. Observation times were divided into morning (7am-11am), lunch (11am-2pm) and afternoon (2 pm-5pm). Weather data like maximum and minimum temperature of the day, rain (including any overnight or earlier in the day), were also recorded.

Faecal samples were collected and holding individuals, for 24 hours and collecting any faeces. Opportunistic collection also made. Separate sample collection was made. Samples were kept in glass tubes, which had species, data collected and habitat. These were air dried before being soaked, in clean water and dissected under a microscope. Compete or near complete invertebrate parts, plant materials etc were removed and air dried again, before being taped to 2mm graph paper for further identification. Preservation of faecal materials was also done, on 10% formalin for further identification.

## STATISTICAL PROCEDURES

In the text the means are followed by  $\pm$  one standard deviation. Analysis was done using SPSS (version 6.0, for Windows) statistical software. Tests were two-tailed with a set at 5% (Snedecor and Cochran, 1980).

Data files were prepared for individual gut (or faeces) contents.



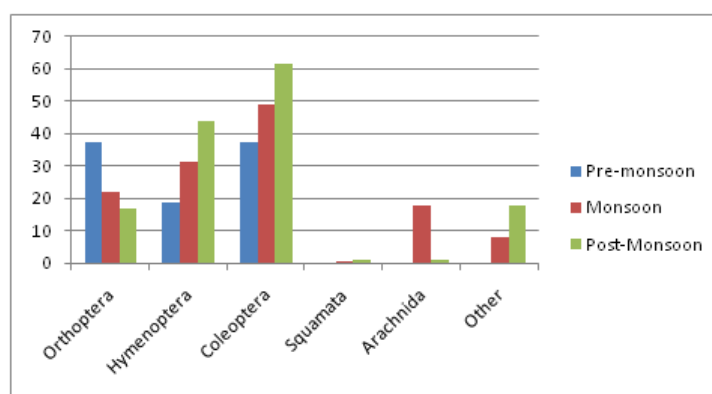
The observations showed that, less activity were recorded during and after the rainfall. It was also observed from the faecal analysis that, after the substantial rainfall on the day, much smaller identifiable remains.

## DIET

### Faecal Analysis

Diet data analysis showed that, over 90% of the food item was composed of terrestrial arthropods. Based on the total number of food items, found in lizard guts, the bulk of the diet consists of isopods and beetles. In the study total 43% isopods were found and 45% beetles. Differences between these two frequencies:  $P > 0.5$ ,  $\chi^2$  test with 1 df.

In total 20 faecal samples were collected. Analysis of percentage of each food class was done. It indicates that, invertebrates are the predominant food. Coleopteran species like beetle, Orthopteran species like cockroach, crickets, Arachnid species like spiders, squamates like small lizards, Hymenopterans like ants are predominant. In different period of the season optional feeding was also noticed, like some plant materials and others.



**Figure: Diet of *Mabuyamulfasciata* at the Three Different Season of the Year**

The faecal sample was dissected and taped to 2 mm graphpaper, with the notes on the observed mater, habitat and date of capture.

## DISCUSSIONS

Previous study by Brooke and Houston (1983), showed that, cannibalism was observed in the skink *Trachylepsis* sp., eating their own shed skin and a large proportion of faecal samples, contained intact skin fragments. This is positively identified in *Mabuya multifasciata* too. Faecal matter analysis showed it. *Mabuya multifasciata* also eat their own species after its death as optional feeding. Invertebrate like insects are predominant food sources, from both the faecal analysis and observation data. Among insects Coleoptera species are predominant. In Pre-monsoon Coleopteran comprises 37.5%, Orthoptera % 37.5 %, Hymenoptera 18.75%, Arachnida 0.062% and others 0.01 %. In monsoon, Coleoptera comprises 49.10 %, Hymenoptera 31.25 %, Orthoptera 22%, Squamata 0.43%, Arachnida 17.50 % and other 8%. In post-monsoon period Coleoptera comprises 61.40 %, Hymenoptera comprises 43.80 %, Orthoptera comprises 17 %, Arachnida comprises 1 % and other 17.50 %.

## CONCLUSIONS

Activity patterns show that, *Mabuya multifasciata* was observed 26 % in between 7am-9am, 36% in between 9am-11am, 51% in between 11am-1pm, 20 % in between 1pm-3pm and 8 % in between 3pm-5 pm. The major visual encounter occurs around 12 noon. According to Evans and Evans (1980), *T. Sechellensis* a skink, also showed the same activity pattern. When, it went for hunting, they hide themselves from the prey and wait for the prey to come. After catching, they shake it vigorously to kill it before swallowing it whole. They only need one prey item per 4 or 5 days, but will eat every day, if conditions are good.

*Mabuya multifasciata* is a diurnal species, showing definite activity pattern, relating to the time of the day. In the rainy season, it is less observed on the open areas and on the roaming state. Before and after the rain, it is less observed. It is an opportunistic feeder, cannibalistic and omnivorous although, invertebrates are the predominant food source.

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